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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,170	08/01/2003	Harunori Hirao	4296-167 US	4596

7590 05/10/2004

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EXAMINER	
PUTTLITZ, KARL J	

ART UNIT	PAPER NUMBER
1621	

DATE MAILED: 05/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/633,170	HIRAO ET AL.	
	Examiner	Art Unit	
	Karl J. Puttlitz	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/1/2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, step c, recites that "said acrylic acid-containing solution absorbed in said acrylic acid absorption column having a water concentration in the range of 1-45 wt. %." However, the acrylic acid-containing solution is obtained, in step c, not absorbed.

Claim 6 recites using acrylic acid to produce polyacrylic acid. However, the claim does not recite any definite process steps. See M.P.E.P. § 2173.05(q) ("Attempts to claim a process without setting forth any steps involved in the process generally raises an issue of indefiniteness under 35 USC 112, second paragraph.").

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,873,368 to Kadowski et al. (Kadowski).

The rejected claims are drawn to, inter alia, a method for the production of acrylic acid comprising a step of introducing a mixed gas containing propylene and molecular oxygen into a first reaction zone packed with a complex oxide catalyst having molybdenum and bismuth as essential components and oxidizing propylene and obtaining an acrolein-containing gas, a step of introducing said acrolein-containing gas into a second reaction zone packed with a complex oxide catalyst having molybdenum and vanadium as essential components and obtaining an acrylic acid-containing gas, and a step of introducing said acrylic acid-containing gas into an acrylic acid absorption column and causing it to contact an absorbent water thereby obtaining an acrylic acid-containing solution

The process further comprises the steps of:

(a) said first reaction zone and said second reaction zone being formed by dividing reaction tubes with at least one perforated tube plate, (b) said mixed gas for introduction into said first reaction zone having a propylene concentration in the range of 7-15 vol. % and a water concentration in the range of 0-10 vol. %, and (c) said acrylic acid-containing solution absorbed in said acrylic acid absorption column having a water concentration in the range of 1-45 wt. %.

or

(a) said first reaction zone and said second reaction zone being formed by dividing reaction tubes with at least one perforated tube plate, (b) said propylene concentration of said mixed gas introduced into said first reaction zone being in the range of 7-15 vol. % and the water concentration in said mixed gas being in the range of

0-10 vol. %, and (c) said water concentration of said acrylic acid-containing solution obtained in the acrylic acid absorption column being adjusted to a level in the range of 1-45 wt. % by adjusting the amount of an absorbent water to be introduced.

See independent claims 1 and 4.

Kadowski teaches a process for the production of acrylic acid, particularly to that by two-stage, vapor-phase, catalytic oxidation of propylene. Specifically, in the first stage, a shell-and-tube heat-exchanger type is used . A shell-and-tube heat-exchanger type reactor, itself, is known. In accordance with this invention, a bed of an oxidation catalyst is accommodated within each of a plurality of tubes corresponding to the cooling tubes of a shell-and-tube heat exchanger and thereby forms an elongated unit reaction zone. Through each of these unit reaction zones, the gas to be oxidized is caused to flow as a so-called tube fluid. See column 5, lines 61-68.

A catalyst which is particularly suitable for use in this invention is one which makes possible the production of a one-pass yield of approximately 88 percent or more, preferably approximately 90 percent or more for the sum of the quantities of the acrolein and acrylic acid at a reaction temperature of 280.degree. to 350.degree. C. A catalyst of this character can be selected from multiple-component catalysts containing Mo and Bi. See column 6, lines 22-30.

In the first stage, the concentration of the propylene in the feed gases is much higher than that ordinarily used, being from 7 to 15 percent. The mol ratio of the molecular oxygen to the propylene should be between 1.17 and 1.66, preferably between 1.20 and 1.50. See column 9, lines 26-35.

The second-stage reaction apparatus can be of any construction and structure suitable for and capable of receiving the gases formed in the first-stage reaction apparatus after air and steam have been added to these gases. Since the suppression of spontaneous oxidation of acrolein need not be considered in the second-stage reaction, quenching of the gases formed is not a requisite. A specific example of a suitable apparatus is one using a fixed bed catalyst. From the viewpoint of facility in controlling the reaction temperature, an apparatus of shell-and-tube heat-exchanger type, as used in the first-stage reaction, is particularly suitable. See description bridging columns 10 and 11.

The feed gases for the second-stage reaction comprise the gases formed in the first-stage reaction and replenished molecular oxygen and steam necessary for the second-stage reaction. See column 11, lines 1-15.

A catalyst of this character can be selected from among multiple-component catalysts each comprising Mo and V. See column 12, lines 15-34.

The separation of the acrylic acid from the gases formed in the second-stage reaction is carried out by an ordinary method. For example, after the gases formed have been cooled to 100 to 180 C by means of heat exchanger they are caused to undergo counterflow contact with cold water containing a polymerization inhibitor or, depending on the case, cooled reaction liquor formed in the form of dew drops thereby to cause the gases to condense thereby to obtain an aqueous solution of acrylic acid.

With regard to the claimed requirement that said first reaction zone and said second reaction zone are formed by dividing reaction tubes with at least one perforated

tube plate, Fig 1 and Fig 2 both illustrate a perforated tube plate (2), which separates the first reaction zone:

FIG. 1

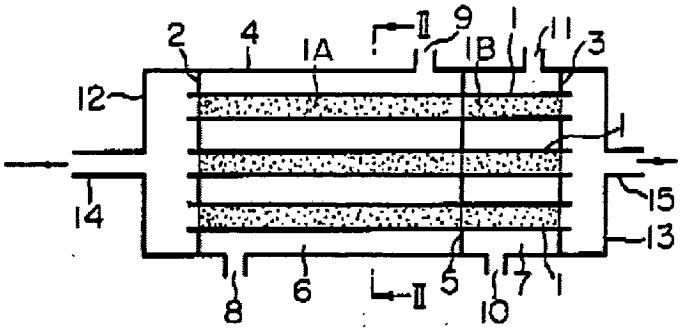
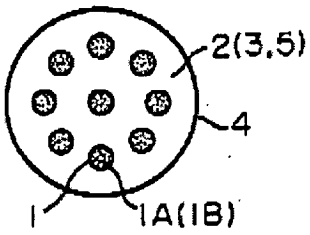


FIG. 2



See column 8, lines 56-63 ("The interior space of the shell 4, outside of the tubes 1 and between the end sheets 2 and 3 is thereby divided into a chamber 6 surrounding the reaction region and a chamber 7 surrounding the cooling region.").

The difference between Kadowaki and the claimed inventions is that Kadowski does not teach the invention with particularity so as to amount to anticipation (See M.P.E.P. § 2131: "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).). However, based on the above, Kadowski teaches the elements of the claimed invention with sufficient guidance, particularity, and with a reasonable expectation of success, that the invention would be *prima facie* obvious to one of ordinary skill (the prior art reference teaches or suggests all the claim limitations with a reasonable expectation of success. See M.P.E.P. § 2143).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-6 (instant claims) provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of copending Application No. 10/632,762 (co-pending application) in view of Kadowaki

This is a provisional obviousness-type double patenting rejection.

The instant claims are drawn to a method for the production of acrylic acid comprising a step of introducing a mixed gas containing propylene and molecular oxygen into a first reaction zone packed with a complex oxide catalyst having molybdenum and bismuth as essential components and oxidizing propylene and obtaining an acrolein-containing gas, a step of introducing said acrolein-containing gas into a second reaction zone packed with a complex oxide catalyst having molybdenum and vanadium as essential components and obtaining an acrylic acid-containing gas, and a step of introducing said acrylic acid-containing gas into an acrylic acid absorption column and causing it to contact an absorbent water thereby obtaining an acrylic acid-containing solution

The process further comprises the steps of:

(a) said first reaction zone and said second reaction zone being formed by dividing reaction tubes with at least one perforated tube plate, (b) said mixed gas for introduction into said first reaction zone having a propylene concentration in the range of 7-15 vol. % and a water concentration in the range of 0-10 vol. %, and (c) said acrylic acid-containing solution absorbed in said acrylic acid absorption column having a water concentration in the range of 1-45 wt. %.

or

(a) said first reaction zone and said second reaction zone being formed by dividing reaction tubes with at least one perforated tube plate, (b) said propylene concentration of said mixed gas introduced into said first reaction zone being in the range of 7-15 vol. % and the water concentration in said mixed gas being in the range of 0-10 vol. %, and (c) said water concentration of said acrylic acid-containing solution obtained in the acrylic acid absorption column being adjusted to a level in the range of 1-45 wt. % by adjusting the amount of an absorbent water to be introduced.

See instant claims 1 and 4.

The claims of the co-pending application are drawn to a method for the production of acrylic acid comprising a step of introducing a mixed gas containing propylene and molecular oxygen into a first reaction zone packed with a complex oxide catalyst having molybdenum and bismuth as essential components and oxidizing propylene and obtaining an acrolein-containing gas, a step of introducing said acrolein-containing gas into a second reaction zone packed with a complex oxide catalyst having molybdenum and vanadium as essential components and obtaining an acrylic acid-containing gas, and a step of introducing said acrylic acid-containing gas into an acrylic acid absorption column and causing it to contact an absorbent thereby obtaining an acrylic acid-containing solution.

The process further comprises the steps of:

(a) said first reaction zone and said second reaction zone being formed of different reaction tubes, (b) said mixed gas for introduction into said first reaction zone having a propylene concentration in the range of 7-15 vol. % and a water concentration

in the range of 0-10 vol. %, and (c) said acrylic acid-containing solution absorbed in said acrylic acid absorption column having a water concentration in the range of 1-45 wt. %.

or

(a) said first reaction zone and said second reaction zone being formed of different reaction tubes, (b) said propylene concentration of said mixed gas introduced into said first reaction zone being in the range of 7-15 vol. % and the water concentration in said mixed gas being in the range of 0-10 vol. %, and (c) said water concentration of said acrylic acid-containing solution obtained in the acrylic acid absorption column being adjusted to a level in the range of 1-45 wt. % by adjusting the amount of an absorbent to be introduced.

See Claims 1 and 4 of the co-pending application.

The difference between the process recited by the instant claims and the process recited by claims 1-6 of the co-pending application is that the instant claims require that said first reaction zone and said second reaction zone are formed by dividing reaction tubes with at least one perforated tube plate. It is for this proposition that the examiner now joins Kadowaki. Specifically, Fig 1 and Fig 2 of Kadowaki both illustrate a perforated tube plate (2), which separates the first reaction zone:

FIG. 1

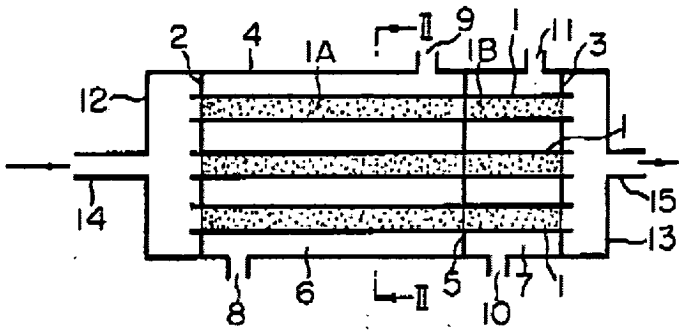
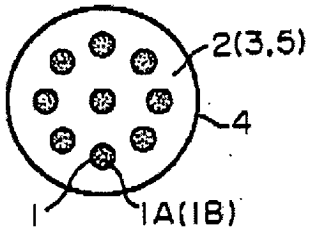


FIG. 2



See column 8, lines 56-63 ("The interior space of the shell 4, outside of the tubes 1 and between the end sheets 2 and 3 is thereby divided into a chamber 6 surrounding the reaction region and a chamber 7 surrounding the cooling region.").

One of ordinary skill would have been motivated to include a perforated plate into the tubes of the instant claims since Kadowaki teaches that this configuration can provide for a cooling region. See column 8, lines 59-63. Therefore, based on the

above, the combination of claims 1-6 of the co-pending application and Kadowaki recite the elements of the claimed invention with sufficient guidance, particularity, and with a reasonable expectation of success, that the invention would be *prima facie* obvious to one of ordinary skill (the prior art reference teaches or suggests all the claim limitations with a reasonable expectation of success. See M.P.E.P. § 2143).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-0645. The examiner can normally be reached on Monday-Friday (alternate).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on (571) 272-0646.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1235.

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